Research on Public Information Seeking Behavior and Fear of Missing Out in Major Public Health Emergencies: A Case Study of the COVID-19 Pandemic (Postprint)

Authors: Geng Ruili, Xu Jianguo, Jin Yan, Wang Na, Fu Lihong

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Abstract

[Purpose/Significance] Following the outbreak of coronavirus disease 2019 (COVID-19), overwhelming volumes of information and public opinion emerged. Accurately comprehending the public's information-seeking behavior and its characteristics during the epidemic outbreak period, and analyzing the formation and influencing factors of Fear of Missing Out (FOMO), holds significant value for emergency management and scientific decision-making in major public health emergencies. [Method/Process] Grounded in Uses and Gratifications Theory and cognitive psychology, this study examines the relationships among FOMO, information-seeking behavior, boredom proneness, and emotion to construct a research model. Through questionnaire surveys, 957 sample data points were collected, and the model was tested using Partial Least Squares (PLS) method, with interviews conducted to discuss and analyze the results. [Results/Conclusions] During the outbreak period of major public health emergencies, mobile new media serves as the primary channel for information acquisition, with balanced behaviors between receiving push notifications/sharing and active searching, longer average daily time expenditure on reading and viewing information, and characteristics of high-frequency, short-interval acquisition. Epidemic concern exerts a significantly positive influence on both FOMO and information-seeking behavior; a significant positive correlation exists between boredom proneness and FOMO. FOMO functions as a motivational factor for information-seeking behavior with a significantly positive effect; individuals with higher FOMO are more susceptible to negative emotions; a significant positive correlation exists between information-seeking behavior and negative emotions.

Full Text

Research on Public Information Acquisition Behavior and Fear of Missing Out During Major Public Health Emergencies: A Case Study of COVID-19

Geng Ruili[1],[2], Xu Jianguo[1], Jin Yan[1],[2], Wang Na[1],[2], Fu Lihong[1],[2]
[1]School of Information Management, Zhengzhou University, Zhengzhou 450001
[2]Institute of Data Science, Zhengzhou University, Zhengzhou 450001

Abstract: [Purpose/Significance] Since the outbreak of Coronavirus Disease 2019 (COVID-19), vast amounts of information and public opinion have spread rapidly. Accurately understanding public information acquisition behavior and its characteristics during the outbreak period, and analyzing the formation and influencing factors of fear of missing out (FoMO), holds significant value for emergency management and scientific decision-making in major public health emergencies. [Method/Process] Based on uses and gratifications theory and cognitive psychology, this study analyzes the relationships among FoMO, information acquisition behavior, boredom proneness, and emotion, and constructs a research model. Using questionnaire surveys, 957 samples were collected, and the model was tested using partial least squares method, with interviews conducted to discuss and analyze the results. [Result/Conclusion] During major public health emergencies, mobile new media serves as the primary channel for information acquisition, with balanced behaviors between receiving push notifications/sharing and active searching. The average daily time spent reading and viewing information is relatively long, showing characteristics of high-frequency and short-interval acquisition. Attention to the epidemic significantly and positively affects FoMO and information acquisition behavior. Boredom proneness shows a significant positive correlation with FoMO. FoMO acts as a motivational factor for information acquisition with a significant positive influence. Individuals with higher FoMO are more susceptible to negative emotions. Information acquisition behavior shows a significant positive correlation with negative emotions.

Keywords: major public health emergency; information acquisition behavior; fear of missing out; COVID-19

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Emergencies are low-probability complex events with insufficient warning signs before occurrence, featuring high destructiveness and potential secondary hazards after occurrence, making them difficult to address with traditional solutions [1]. Since December 2019, COVID-19 broke out in Wuhan, China. On January 24, Hubei Province activated a Level I public health emergency response. On January 30, the World Health Organization declared the novel coronavirus outbreak a Public Health Emergency of International Concern.

1 Literature Review

By February 2, mainland China had reported a cumulative total of 17,205 confirmed cases and 21,558 suspected cases [2]. In early February, the domestic epidemic was in its outbreak period with infections at their peak. By February 21, mainland China had reported 76,288 cumulative confirmed cases [3]. By March, the domestic epidemic had been effectively controlled [4]. However, the global outbreak continued to grow, with over 6 million confirmed COVID-19 cases worldwide by June 1 [5].

During the epidemic outbreak period, massive amounts of information and public opinion flooded in. People obtained information through various media channels, while also experiencing anxiety from missing certain important information. This study focuses on public information acquisition behavior during the epidemic outbreak period, analyzing the formation and influencing factors of FoMO through online surveys to provide references for emergency management and scientific decision-making in major public health emergencies.

Existing research on user information behavior during emergencies mainly includes rumor identification [6] and information dissemination and sharing [7-8]. Regarding information acquisition behavior during emergencies, Zhang Yan et al. found through questionnaire surveys that the public has channel preferences for obtaining emergency information, with television, family or friends, newspapers and magazines, the internet, radio, government departments, and community organizations being the most frequently used channels. Older individuals prefer watching television, while older and more educated individuals prefer obtaining information through newspapers and magazines [9]. P.R. Spence et al. conducted a questionnaire survey 2-5 days after the 9/11 terrorist attacks and found that gender and age affect information acquisition channels, with women preferring television and radio, men obtaining more information from the internet, and younger people using the internet and print media more frequently [10]. Sun Shaodan pointed out that during emergencies, positive factors influencing users' continued intention to use Weibo for information include performance expectancy, effort expectancy, social influence, and satisfaction [11]. These studies show that information acquisition channels during emergencies vary by demographic characteristics, but in-depth analysis of information volume, acquisition frequency, and time spent is still lacking.

Fear of missing out (FoMO) refers to a widespread anxiety that occurs when individuals fail to obtain desired experiences from events in which they are absent, primarily manifested as a desire to continuously know what others are doing [12]. Academic research on FoMO mainly focuses on influencing factors and consequences. Influencing factors include demographic characteristics, psychological factors, and social factors. Studies have found that gender, age, region, occupation, education level, and experience affect FoMO, with males and adolescents tending to show higher levels of FoMO [13]. Personality traits can also explain FoMO, such as the positive correlation between neuroticism and FoMO

among internet users [14]. FoMO is associated with psychological factors; A.K. Przybylski et al. believe FoMO can be understood as a phenomenon resulting from insufficient self-regulation due to unmet psychological needs, where individuals with lower satisfaction of basic psychological needs are more likely to experience FoMO [12]. FoMO negatively impacts work, study, and life to some extent. For example, J.P. Abel et al. found that higher FoMO reduces well-being [15]; S.L. Buglass et al. found that social network users with higher FoMO have lower self-esteem [16]; FoMO is associated with social network addiction [17-18] and may lead to mental stress [19], poor college adjustment [20], poor sleep [21], and depression [22].

FoMO can occur in different contexts, such as ubiquitous socializing [12] and mobile social media [23], as well as specific situations like classes [20] and conferences [24]. Existing results help explain FoMO and its influencing factors in traditional contexts, but FoMO and its formation mechanisms in the context of public health emergencies require further analysis. Therefore, this study examines the COVID-19 epidemic to clarify public information acquisition behavior characteristics and explore the formation factors of FoMO and its impact on emotions from multiple perspectives including attention and boredom proneness, providing decision-making basis for emergency management of major public health emergencies.

2 Model Construction

2.1 Attention

Collective attention refers to the common interest preferences of certain user groups in social networks, or the objects these users focus on and changes in their attention during specific periods [25]. Collective attention is composed of individual attention [26]; therefore, this study's attention refers to individual attention—the degree to which individuals pay attention to the epidemic. Cognitive psychology suggests that individuals need to expend energy when processing stimuli from their environment (such as information), focusing on specific memories and ideas while ignoring others [27], which manifests as attention that is selective. Related research shows that users' attention to health information affects their information search and acquisition behavior [28], and information volume is related to attention level—for example, attention to new topics among online forum users can be measured and predicted by the number of replies [29].

During major public health emergencies, public attention rises sharply, with information release volume reaching its peak and remaining at high levels in a short period [30]. At this time, the public is highly likely to show high attention. Since the transmission and treatment methods of the novel coronavirus are not yet fully understood, people continuously obtain and consult information through the internet or other media channels, also showing anxiety about missing important information.

2.2 Information Acquisition Behavior

Uses and gratifications theory posits that individuals' needs arise from social and psychological factors, which stimulate expectations for mass media or other channels. Different expectations lead to different media contact and usage patterns, and media use in turn satisfies individuals' needs. In this process, the audience is active and rational media users [31]. This theory has been widely adopted in academic research to explain media selection behavior from different motivational dimensions and to explore the relationship between user information behavior and need satisfaction in traditional media, the internet, and new media like social networks [32]. According to uses and gratifications theory, people have different motivations when choosing to use different media (including the internet and social media) [33]. A. Whiting and D.L. Williams found that one important motivation for using social media is information seeking, including understanding what is happening around them and its progress [34].

In this study, the public shows high attention to major public health emergencies, manifested as a need to further understand the event's progress, thus generating information needs. The level of attention can measure the degree of information need. Users satisfy their needs by using various media channels to obtain information. After acquiring large amounts of information, they can gain a more comprehensive understanding of the epidemic's development and a clearer understanding of virus protection, which helps alleviate negative emotions caused by the epidemic such as worry and helplessness, while strengthening positive emotions like calmness and optimism. Accordingly, the following hypotheses are proposed:

H1: Public attention to the epidemic is positively correlated with information acquisition behavior.

H2: Information acquisition behavior is positively correlated with positive emotions.

H3: Information acquisition behavior is negatively correlated with negative emotions.

2.3 Fear of Missing Out

Cognitive psychology suggests that FoMO induces a series of cognitive and behavioral imprinting reactions [35]. Individuals with higher FoMO levels often have attention bias. Research has found that individuals with higher FoMO levels have higher probabilities of cognitive failure behaviors such as learning distraction and attention dispersion [12]. Individuals with higher FoMO levels often worry about missing important information and activities, so they hope to alleviate this fear through various channels. U. Oberst et al. pointed out that FoMO is related to mobile phone use. Multi-functional mobile social media can not only conveniently help individuals obtain information but also satisfy their psychological needs for interaction and self-presentation, making

individuals with FoMO more likely to form dependence [36]. Meanwhile, C.A. Wolniewicz et al. believe that FoMO is related to negative emotions [37]. Individuals with FoMO have lower emotional and life satisfaction [38]. In mobile social media environments, people subconsciously or psychologically experience varying degrees of anxiety, including discomfort, unease, restlessness, or panic [35].

FoMO during the epidemic period is a diffuse anxiety symptom caused by individuals' worry about missing important epidemic information, similar to information compulsion. The public desires to understand what is happening externally, fears missing meaningful or personally important information, produces psychological refraction, and consequently expends substantial energy on information acquisition and reading. Therefore, this study proposes that the level of attention to the epidemic can reflect the degree of FoMO, that FoMO is related to information acquisition behavior (including information volume, time spent, and acquisition frequency), and that FoMO is also related to emotions, especially negative emotions. Accordingly, the following hypotheses are proposed:

H4: Public attention to the epidemic is positively correlated with FoMO.

H5: FoMO is positively correlated with information acquisition behavior.

H6: FoMO is negatively correlated with positive emotions.

H7: FoMO is positively correlated with negative emotions.

2.4 Boredom Proneness

Boredom is a negative experience that typically occurs when lacking meaning, interest, and challenge, leading individuals to change behaviors or situations to alleviate boredom [39]. Boredom proneness (BP) includes difficulties in attention and impulse control that lead to boredom experiences [40]. A.A. Struk et al. found that boredom proneness is positively correlated with negative affect (depression, anxiety) [41]. C.A. Wolniewicz et al. conducted an empirical study on American college students and found that boredom proneness shows a highly significant positive correlation with FoMO, which in turn is positively correlated with frequent smartphone use. Boredom proneness acts as a mediator and can serve as a predictor of problematic mobile phone use [42]. Another empirical study on smartphone use behavior also examined the relationship between boredom proneness and FoMO [43]. E. Wegmann et al. pointed out that people try to use or overuse smartphones to alleviate boredom proneness, but this overuse not only fails to relieve boredom but reinforces it [44]. A. Lepp et al. also noted that leisure boredom (similar to boredom proneness) is related to problematic smartphone use [45].

During the domestic epidemic outbreak period, most people were at home under social isolation, a situation that easily increases boredom. Based on the above analysis, boredom proneness is related to FoMO, and FoMO acts as a mediating

variable that affects information acquisition behavior. Therefore, the following hypothesis is proposed:

H8: Boredom proneness is positively correlated with FoMO.

Based on the above analysis, this study empirically explores the relationships and mechanisms among user attention, FoMO, boredom proneness, information acquisition behavior, and emotions during major public health emergencies, constructing the research model shown in Figure 1 [Figure 1: see original paper].

3 Research Design and Data Collection

3.1 Questionnaire Design

To test the proposed research model, the questionnaire "How Are You Doing with Epidemic Information?—A Survey on Public Attention and Information Acquisition Behavior Regarding COVID-19" was designed. The survey used self-reporting and included three parts: the first part measured attention and information acquisition behavior; the second part included scales for FoMO, boredom proneness, and emotions; and the third part collected demographic measurements.

The attention scale used a single item where users self-reported their degree of attention to the epidemic. Information acquisition behavior included information channels, acquisition methods, content categories, information volume, time spent (for viewing or reading information), acquisition frequency, and time intervals. Positive emotions included calmness and optimism, while negative emotions included worry, helplessness, fear, sadness, anger, and panic, each measured with single items using a Likert scale.

For the FoMO scale, A.K. Przybylski et al. first developed a 10-item scale in 2013 to measure FoMO in social interactions [12], which has been adopted or adapted in subsequent research, such as Ye Fengyun et al.'s scale for measuring FoMO among college students using mobile social media [46]. Some scholars have proposed more concise scales, such as B.C. Riordan et al.'s single-item FoMO scale for time-limited surveys [47]. This study combines A.K. Przybylski et al.'s FoMO scale and Ye Fengyun et al.'s scale. Since this survey targets FoMO regarding information in a specific major public health emergency, situational characteristic measurement factors were excluded, and information characteristic measurement factors were selected, resulting in three measurement items.

The boredom proneness scale was adapted from A.A. Struk et al.'s research [41], which streamlined R. Farmer and N.D. Sundberg's scale [48]. The emotion scale used single-item measurements for self-reported perceived levels. The measurement items for FoMO and boredom proneness are shown in Table 1 .

After questionnaire design, a pretest was conducted with 10 researchers and master's students in library and information science and 10 members of the

general public. The pretest evaluated the necessity and usefulness of items for measuring variables and refined questionnaire wording.

3.2 Data Collection and Interviews

The questionnaire survey was conducted online through the Wenjuanxing platform, with data collected via WeChat snowball sampling from 19:00 on February 2 to 10:00 on February 4, 2020. A total of 959 questionnaires were collected. Among all respondents, two indicated "no attention at all" to the epidemic and did not complete the survey. In the FoMO screening item, 287 respondents reported "not feeling anxious when not checking epidemic information," while the remaining 650 experienced varying degrees of FoMO. Demographic characteristics are shown in Table 2 .

In terms of gender, female samples outnumbered male samples, but the number of male samples still reached a medium sample size. Age distribution was relatively even; most respondents had bachelor's degrees or higher; occupational status was mainly enterprise and institution personnel, with medical personnel accounting for nearly 5%; in terms of geographical distribution, 22 were in Wuhan and 40 in other parts of Hubei Province. In terms of proportions, there was no significant difference in FoMO between respondents in Wuhan/Hubei and other regions.

Based on the survey results, five respondents were interviewed via WeChat voice calls from February 20-24, with each interview lasting approximately 30 minutes to gain in-depth understanding of their information acquisition behavior and FoMO levels.

4 Data Analysis and Results

4.1 Descriptive Characteristics Analysis

4.1.1 Attention Among all survey samples, only two respondents indicated "no attention at all" to the epidemic. Those who were "somewhat concerned" accounted for 2.09%, "relatively concerned" for 19.81%, and "highly concerned" for 77.89%. The results show that most of the public demonstrated high attention to this epidemic. Although public attention was high, 44.62% of those who were "highly concerned" still rated their own attention level as "moderate," indicating that while the epidemic received widespread high attention, most people considered their attention level appropriate rather than excessive. Details are shown in Table 3 .

4.1.2 Information Acquisition Behavior To comprehensively understand public information acquisition behavior, the survey examined information channels, acquisition volume, and checking frequency. The results are shown in Table 4 . Public channels for obtaining epidemic information were, in order: WeChat (including friends, groups, and Moments), WeChat official accounts,

media websites or mobile apps, Weibo, and television, indicating that new media has become the primary channel. This is due to the convenience of mobile media, which greatly reduces the time spent on information acquisition, improves efficiency, and saves costs.

The main methods for obtaining epidemic information were "browsing media for information," followed by "media automatic push." Although active information searching was the primary form, receiving push notifications and sharing from others also accounted for nearly half of acquisition methods. This shows that for public health emergencies, both receiving push notifications/sharing and active searching are main forms of information acquisition. Regarding types of epidemic information obtained, factual data (including confirmed and suspected case numbers) was the most concerned, followed by prevention and control measures and frontline treatment information.

Regarding time spent, 16.41% of respondents spent less than one hour per day reading or watching epidemic information, while the rest spent more than one hour, with 10.03% spending five hours or more daily. Information volume can be reflected by the number of items obtained, with 38.98% of respondents obtaining more than 20 items daily and only 5.85% obtaining 0-5 items. In terms of checking frequency, 26.85% of respondents checked epidemic information every 1-2 hours, and 3.76% checked within less than 10 minutes. Checking frequency reflects both high-frequency acquisition behavior and high public attention to epidemic information. The number of checks also reflects acquisition behavior, with 28.63% checking 6-10 times daily and 16.82% checking more than 30 times daily. Although the average daily time spent reading information is relatively long, acquisition frequency shows characteristics of high frequency and short intervals. As the epidemic developed, public information acquisition behavior also changed, with 36.93% reporting that their checking frequency had continuously increased since January 20, while 31.80% reported it first increased then decreased or remained unchanged.

The questionnaire also investigated how long respondents could go without checking epidemic information before feeling anxious. 30.63% reported they would not feel anxious, while 69.37% experienced FoMO when not checking epidemic information—a relatively high proportion. Among all respondents, 17.18% reported feeling anxious if they did not check information for 3-5 hours, 15.05% for 1-2 hours, and 3.09% within 10 minutes. The shorter the interval, the more anxious users become.

4.2 Model Testing

4.2.1 Reliability and Validity Analysis If each indicator truly reflects the measured variable, such indicators are reflective indicators. All indicators collectively determine the overall variable, which are formative indicators [49]. Mistakenly treating formative indicators as reflective indicators can affect the validity of research results. In this study, FoMO and BP are reflective indicators,

where variable changes cause indicator changes, and any single item substantially reflects the variable. Multiple measurement items for a single variable are correlated and interchangeable. Reliability testing for reflective indicators mainly involves internal consistency coefficient (Cronbach's α), with values of 0.7 or above generally considered acceptable [50]. Composite reliability (CR) can also be used for reliability testing.

In this model, the consistency coefficients and composite reliability values for FoMO and BP variables are above the critical value of 0.7 (see Table 5), meeting reliability requirements and indicating high internal consistency and reliability. Validity includes content validity and construct validity. Since some questionnaire items were adapted from existing literature and others were designed based on the characteristics of this research object, the questionnaire has content validity. Construct validity evaluation indicators include factor loadings and average variance extracted (AVE). Generally, factor loadings above 0.7 and AVE values greater than 0.5 indicate acceptable validity [51]. The validity analysis results for reflective variables meet threshold requirements.

Formative variable indicators do not necessarily contain common components; indicators capture parts of the variable and are not interchangeable. Indicators can be highly correlated, lowly correlated, or any other correlation form [52]. In this study, attention, information acquisition behavior, positive emotions, and negative emotions are formative variables, using the sum average of each factor as the variable value. Information acquisition behavior includes factors such as information volume, time spent, and checking frequency. Positive emotion variables include calmness and optimism factors. Negative emotion variables include worry, helplessness, fear, sadness, anger, and panic factors.

For formative variables, since correlations between indicators can be positive, negative, or zero, consistency coefficients and composite reliability are not suitable. Scholars have noted that formative variables do not require reliability estimation [53]. Formative variable indicators collectively determine the variable's connotation in a set manner; therefore, removing any indicator would change construct validity [54].

4.2.2 Model Testing Control variables included gender, age, and education level. Male was coded as 1, female as 2. Age was converted to values 1-7 by stage, and education level was converted to values 1-5 sequentially. For formative factors of information acquisition behavior, information volume, reading time, and acquisition frequency were coded as values 1-5 from low to high.

Given that the research model includes both reflective and formative variables, partial least squares (PLS) method was used for model testing, with SmartPLS 3.0 software employed. Bootstrap resampling method was used for significance testing of collected data, with results shown in Table 6 .

Regarding control variables, gender showed no statistically significant relationship with attention, boredom proneness, FoMO, or information acquisition be-

havior, but showed a significant negative correlation with positive emotions (β = -0.145, P < 0.01) and a significant positive correlation with negative emotions (β = 0.140, P < 0.001). The results indicate that compared to males, females are more likely to experience negative emotions. Age was positively correlated with attention (β = 0.233, P < 0.001) and information acquisition behavior (β = 0.156, P < 0.01), and negatively correlated with boredom proneness (β = -0.210, P < 0.001), indicating that older individuals show higher attention and information acquisition behavior but lower boredom proneness compared to younger individuals. Education level showed no statistically significant correlation with FoMO or information acquisition behavior, indicating that education level does not significantly affect FoMO or information acquisition behavior. However, education level was negatively correlated with boredom proneness (β = -0.092, P < 0.05) and positively correlated with positive emotions (β = 0.084, P < 0.05), indicating that higher education levels are associated with lower boredom proneness and higher positive emotions.

Attention showed highly significant positive correlations with both information acquisition behavior (β = 0.201, P < 0.001) and FoMO (β = 0.160, P < 0.001), indicating that higher public attention to the epidemic leads to higher information acquisition behavior and FoMO levels. Thus, hypotheses H1 and H4 are supported. Boredom proneness also showed a highly significant positive correlation with FoMO (β = 0.254, P < 0.001), indicating that boredom proneness positively affects FoMO, supporting hypothesis H8. FoMO showed a significant positive correlation with information acquisition behavior (β = 0.186, P < 0.001), indicating that higher FoMO leads to higher information acquisition behavior, supporting hypothesis H5. FoMO showed no significant correlation with positive emotions but a significant positive correlation with negative emotions (β = 0.101, P < 0.001), indicating that hypothesis H6 is not supported while hypothesis H7 is supported. Information acquisition behavior showed no significant correlation with positive emotions but a significant positive correlation with negative emotions (β = 0.102, P < 0.05), indicating that hypothesis H2 is not supported and hypothesis H3 is rejected.

Discussion

The testing results show that gender, age, and education level are not significantly correlated with FoMO. A.K. Przybylski et al.'s online survey in the UK found that nearly three-quarters of young people have experienced FoMO, with young people, especially young males, tending to show higher levels of FoMO [12]. This study focuses on a special situation where the public's FoMO regarding major public health emergencies does not significantly differ by gender, age, or education level.

Age and education level show significant negative correlations with boredom proneness, indicating that older and more educated individuals are less likely to experience boredom proneness and less likely to be in a "nothing to do" state due to the epidemic. However, age shows significant positive correlations with

attention and information acquisition behavior, indicating that older individuals have higher attention to the epidemic and higher information acquisition behavior, manifested by richer information volume, longer reading time, and more frequent acquisition. More educated individuals are more likely to experience calm and optimistic positive emotions, while females are more likely to experience negative emotions. The possible reason is that females have advantages in interpreting emotional information, perceiving their own emotions, and social aspects compared to males. Related empirical evidence also shows that females are more susceptible to negative emotions during unconventional emergencies [55].

5.2 Attention, FoMO, and Information Acquisition Behavior

The testing results show that public attention to the epidemic significantly and positively affects FoMO and information acquisition behavior, with relatively high path coefficients. Interview results show that Interviewee A (female, 40 years old, housewife) was "extremely concerned, checking confirmed and suspected data several times daily, especially for my city, and constantly refreshing messages in the community owners' group. If I don't see the latest data in time, I fall into anxiety, feeling that people around me might be infected without my knowledge." This demonstrates that the level of attention to major public health emergencies directly affects information acquisition behavior and causes anxiety from missing information. Higher attention leads to greater need and desire for event-related information and stronger unwillingness to miss important data, making FoMO more likely. Only by investing substantial time and energy in continuously obtaining various types of information can the psychological need for FoMO be satisfied. Behavioral intention depends on perceived importance psychologically; high attention is an important driving force for user information acquisition behavior, leading to repetitive behaviors such as repeatedly checking epidemic information, frequently logging into media platforms, and continuously immersing in reading or viewing information.

Interviewees B (male, 39 years old, company employee) and C (female, 32 years old, company employee) also reported checking confirmed data multiple times daily on both mobile phones and television, and searching for related comments and original content on Weibo for topics of interest. Interview content analysis shows that during the epidemic outbreak, the public obtained large amounts of information with long reading times and high acquisition frequency. Interviewee D (female, 22 years old, college student) reported "reading a lot of information about virus research. Since there is still no effective medicine to deal with it and people still don't understand it well, I feel angry. Seeing infected people, especially medical staff who have sacrificed, I feel very sad and want to cry. Life is too fragile." The relationship between information acquisition behavior and negative emotions can be explained by empathy—understanding and sharing the emotional states of others based on their situations [56]. Therefore, when checking epidemic information for long periods or with high frequency, empa-

thy for people and events in the epidemic can trigger sadness and anxiety, or attribution analysis of the epidemic through one's own cognitive processes can generate anger and panic.

5.3 Boredom Proneness, FoMO, and Information Acquisition Behavior

Boredom proneness shows a significant positive correlation with FoMO, consistent with G.A. Wolniewicz et al. [42] and J.D. Elhai et al. [43] regarding online social networks. Boredom proneness is a psychological feeling and experience that can predict FoMO to some extent. Data collection for this study took place on February 2-4, during the epidemic outbreak period. Although the statutory Spring Festival holiday had ended, due to epidemic control measures, the country remained in a state of "extended holiday, delayed school opening, and postponed work resumption." In this data collection, only 16.1% of respondents reported "working due to epidemic needs," while 83.9% remained "at home on holiday." This situation also exacerbated boredom proneness to some extent.

Boredom proneness shows no significant correlation with information acquisition volume and checking frequency but a significant positive correlation with information reading time. Individuals with higher boredom proneness are in an "endless" state of not knowing what to do. For example, Interviewee E (female, 65 years old, retired) reported "cannot go out, have nothing important to do, sit on the sofa watching news or television, and can even see scrolling epidemic news at the bottom of the screen when watching TV dramas." This shows that boredom proneness leads to actively or passively spending large amounts of time reading or watching epidemic information, forming a positive influence of boredom proneness on reading time.

5.4 FoMO, Information Acquisition Behavior, and Emotions

Existing empirical results indicate that FoMO is positively correlated with problematic mobile phone use (or excessive social network use) [18, 36]. This study's testing results show that FoMO is significantly positively correlated with information acquisition behavior. The psychological need for anxiety caused by missing important information can only be satisfied by repeatedly and frequently obtaining large amounts of related information. Survey results also show that mobile new media has become the primary channel for epidemic information, and increased information acquisition behavior can also be reflected through excessive mobile phone (or social network) use. Therefore, this study's testing results on the significant positive correlation between FoMO and information acquisition behavior are consistent with existing research. Second, the significant positive correlation between FoMO and negative emotions indicates that individuals with higher FoMO are more likely to experience worry, helplessness, fear, sadness, anger, and panic, consistent with U. Oberst et al.'s [36] research on social networks showing that FoMO is related to negative emotions.

Regarding the relationship between information acquisition behavior and emotions, the testing results show no significant correlation with positive emotions but a significant positive correlation with negative emotions. This study's main conclusions are: (1) The public showed high attention to major public health emergencies, with mobile new media as the primary information acquisition channel. Receiving push notifications/sharing and active searching are balanced as main acquisition methods, with relatively long daily time spent reading and viewing information, showing characteristics of high-frequency and short-interval acquisition. About 70% of the public experienced FoMO due to epidemic information—a relatively high proportion. (2) In major public health emergencies, epidemic attention significantly and positively affects FoMO and information acquisition behavior variables, with relatively high path coefficients. Boredom proneness shows a significant positive correlation with FoMO. FoMO is a motivational factor for information acquisition, with a significant positive correlation. The psychological need for anxiety caused by missing important information can only be satisfied through repeated, high-frequency acquisition of large amounts of related information. (3) FoMO shows a significant positive correlation with negative emotions, with individuals with higher FoMO more susceptible to negative emotions. Information acquisition behavior shows no significant correlation with positive emotions but a significant positive correlation with negative emotions—higher epidemic information acquisition leads to more negative emotions like sadness, anger, and panic.

This study's results clarify public information acquisition behavior and characteristics, FoMO and its influencing factors, and the impact of information acquisition behavior on emotions during major public health emergencies. These findings have practical guidance value for emergency management, especially information release and psychological counseling during outbreak periods.

References

[1] Fu Changbo, Liu Bing, Du Jingyuan, et al. Knowledge system and innovation space for public opinion evolution patterns in major emergencies [J]. Risk, Disaster & Crisis Research, 2017(3): 117-132.

[2] National Health Commission. Latest situation of COVID-19 epidemic as of 24:00 on February 2 [EB/OL]. [2020-02-03]. http://www.nhc.gov.cn/xcs/yqtb/202002/24a79681bf747bd8b9453

[3] National Health Commission. Latest situation of COVID-19 epidemic as of 24:00 on February 21 [EB/OL]. [2020-02-22]. http://www.nhc.gov.cn/xcs/yqtb/202002/543cc508978a48d2b932

[4] Ministry of Commerce of the People's Republic of China. Online press conference on stabilizing foreign investment in response to the epidemic [EB/OL]. [2020-04-03]. http://www.gov.cn/xinwen/2020-04/03/content_{5498739}.htm.

[5] World Health Organization. The latest data on the COVID-19 global outbreak [EB/OL]. [2020-06-02]. https://www.who.int/data.

[6] Zhang Huiping, Guo Xinhao, Guo Ning. Research on behavioral intention of

online rumor identification during emergencies [J]. Modern Intelligence, 2017, 37(7): 60-65.

[7] Chen R. Exploring the effect of perceived distance on sharing of crisis information in social media [C]//Proceedings of the 17th International Digital Government Research Conference. New York: Association for Computing Machinery, 2016: 527-529.

[8] Yang Changzheng. Research on the impact of network information representation on users' continuous sharing intention during crisis events [J]. Current Psychology, 2018, 37(1): 128-138.

[9] Zhang Yan, Wei Jiuchang, Qi Wei. Public channel preferences for information acquisition during emergencies [J]. Information Science, 2012, 30(4): 574-578.

[10] Spence PR, Westerman D, Skalski PD, et al. Gender and age effects on information-seeking after 9/11 [J]. Communication Research Reports, 2006, 23(3): 217-223.

[11] Sun Shaodan. Research on public continuous use of Weibo for information acquisition during emergencies [J]. Library and Information Service, 2019, 63(21): 105-116.

[12] Przybylski AK, Murayama K, DeHaan CR, et al. Motivational, emotional, and behavioral correlates of fear of missing out [J]. Computers in Human Behavior, 2013, 29(4): 1841-1848.

[13] Lamblin M, Murawski C, Whittle S, et al. Social connectedness, mental health and the adolescent brain [J]. Neuroscience & Biobehavioral Reviews, 2017, 80(9): 57-68.

[14] Dorit A, Meyran BN. Using multidimensional scaling and PLS-SEM to assess the relationships between personality traits, problematic internet use, and fear of missing out [J]. Behaviour & Information Technology, 2018, 37(10/12): 1264-1276.

[15] Abel JP, Buff CL, Burr SA. Social media and the fear of missing out: scale development and assessment [J]. Journal of Business & Economics Research, 2016, 14(1): 33-44.

[16] Buglass SL, Binder JF, Betts LR, et al. Motivators of online vulnerability: the impact of social network site use and FoMO [J]. Computers in Human Behavior, 2017, 66(1): 248-255.

[17] Blackwell D, Leaman C, Tramposch R, et al. Extraversion, neuroticism, attachment style and fear of missing out as predictors of social media use and addiction [J]. Personality and Individual Differences, 2017, 116(10): 69-72.

[18] Kuss DJ, Griffiths MD. Social networking sites and addiction: ten lessons learned [J]. International Journal of Environmental Research and Public Health, 2017, 14(3). doi:10.3390/ijerph14030311.

[19] Beyens I, Frison E, Eggermont S. "I don't want to miss a thing": adolescents' fear of missing out and its relationship to adolescents' social needs, Facebook use, and Facebook related stress [J]. Computers in Human Behavior, 2016, 64(11): 1-8.

[20] Alt D. Students' well-being, fear of missing out, and social media engagement for leisure in higher education learning environments [C]//Kim Y, Liu M. Proceedings of the 17th International Digital Government Research Conference. New York: Association for Computing Machinery, 2016.

[21] Adams SK, Williford DN, Vaccaro A, et al. The young and the restless: socializing trumps sleep, fear of missing out, and technological distractions in first-year college students [J]. International Journal of Adolescence and Youth, 2017, 22(3): 337-348.

[22] Gao Qiufeng. Negative emotions increase social media use: the mediating role of FoMO [C]//Chinese Psychological Society. Abstracts of the 21st National Psychology Academic Conference. Beijing: Chinese Psychological Society, 2018: 492-493.

[23] Zhao Yuxiang, Zhang Xuanhui, Song Xiaokang. Research review and prospects on user fear of missing out (FoMO) in mobile social media environments [J]. Library and Information Service, 2017, 61(8): 133-144.

[24] McCartney M. Fear of missing out on conferences [J]. BMJ Clinical Research, 2017, 359: j4515.

[25] Wu F, Huberman BA. Novelty and collective attention [J]. Proceedings of the National Academy of Sciences of the United States of America, 2007, 104(45): 17599-17601.

[26] Freese M. Creating collective attention in the public domain: human interest narratives and the rescue of Floyd Collins [J]. Social Forces, 2002, 81(1): 57-85.

[27] Fiske ST, Taylor SE. Social Cognition: How People Think About Themselves and Others [M]. Translated by Zhang Qinglin, Chen Xingqiang, Jiang Hong, et al. Guizhou: Guizhou People's Publishing House, 1994: 196-205.

[28] Shang Lili, Wang Tao. Research on WeChat health information attention based on user information behavior [J]. Information Science, 2019, 37(8): 132-138.

[29] Yang Deqing, Xiao Yanghua, Wang Wei. Analysis and prediction of group attention in social networks based on statistical models [J]. Journal of Computer Research and Development, 2010, 47(z1): 378-385.

[30] An Lu, Du Tingyao, Li Gang, et al. Attention and evolution patterns of stakeholders in social media during public health emergencies [J]. Journal of the China Society for Scientific and Technical Information, 2018, 37(4): 394-405.

[31] Katz E, Blumler JG, Gurevitch M. Uses and gratifications research [J]. Public Opinion Quarterly, 1973, 37(4): 509-523.

[32] Azam A. The effect of Website interface features on e-commerce: an empirical investigation using the use and gratification theory [J]. International Journal of Business Information Systems, 2015, 19(2): 205-223.

[33] Kuyucu C, Chu TH, Tseng CH. Gratifications for using CMC technologies: a comparison among SNS, IM, and e-mail [J]. Computers in Human Behavior, 2013, 29(1): 226-234.

[34] Whiting A, Williams DL. Why people use social media: a uses and gratifications approach [J]. Qualitative Market Research, 2013, 16(4): 362-369.

[35] Song Xiaokang, Zhao Yuxiang, Zhang Xuanhui. Research on the development of a user fear of missing out (FoMO) scale in mobile social media environments [J]. Library and Information Service, 2017, 61(11): 96-105.

[36] Oberst U, Wegmann E, Stodt B, et al. Negative consequences from heavy social networking in adolescents: the mediating role of fear of missing out [J]. Journal of Adolescence, 2017, 55(2): 51-60.

[37] Wolniewicz CA, Tiamiyu MF, Weeks JW, et al. Problematic smartphone use and relations between negative affect, fear of missing out, and fear of negative and positive evaluation [J]. Psychiatry Research, 2018, 262(4): 618-623.

[38] Tomczyk Ł, Selmanagić-Lizde E. Fear of missing out (FoMO) among youth in Bosnia and Herzegovina-scale and selected predictors [J]. Current Psychology, 2018(1): 1-6.

[39] Sansone C, Weir C, Harpster L, et al. Once a boring task always a boring task? Interest as a self-regulatory mechanism [J]. Journal of Personality and Social Psychology, 1992, 63(3): 379-390.

[40] Isacescu J, Struk AA, Danckert J. Cognitive and affective predictors of boredom proneness [J]. Cognition and Emotion, 2017, 31(8): 1741-1748.

[41] Struk AA, Carriere JSA, Cheyne JA, et al. A short boredom proneness scale: development and psychometric properties [J]. Assessment, 2017, 24(3): 346-359.

[42] Wolniewicz CA, Rozgonjuk D, Elhai JD. Boredom proneness and fear of missing out mediate relations between depression and anxiety with problematic smartphone use [J]. Human Behavior and Emerging Technologies, 2020, 2(1): 61-70.

[43] Elhai JD, Levine JC, Alghraibeh AM, et al. Fear of missing out: testing relationships with negative affectivity, online social engagement, and problematic smartphone use [J]. Computers in Human Behavior, 2018, 89(8): 289-298.

[44] Wegmann E, Ostendorf S, Brand M. Is it beneficial to use Internet-communication for escaping from boredom? Boredom proneness interacts with cue-induced craving and avoidance expectancies in explaining symptoms of Internet-communication disorder [J]. PLOS ONE, 2018, 13(4). doi:10.1371/journal.pone.0195742.

[45] Lepp A, Barkley JE, Li J. Motivations and experiential outcomes associated with leisure time cell phone use: results from two independent studies [J]. Leisure Sciences, 2017, 39(2): 144-162.

[46] Ye Fengyun, Hu Yaping, Shen Si. Research on the influence mechanism and scale development of college students' mobile social media FoMO [J]. Information Studies: Theory & Application, 2019(7): 93-99.

[47] Riordan BC, Cody L, Flett JAM, et al. The development of a single item FoMO (fear of missing out) scale [J]. Current Psychology, 2018(1): 1-6.

[48] Farmer R, Sundberg ND. Boredom proneness—the development and correlates of a new scale [J]. Journal of Personality Assessment, 1986, 50(1): 4-17.

[49] Diamantopoulos A, Siguaw JA. Formative versus reflective indicators in organizational measure development: a comparison and empirical illustration [J]. British Journal of Management, 2006, 17(4): 263-282.

[50] George D, Mallery P. SPSS for Windows Step by Step: A Simple Guide and Reference [M]. 4th ed. Boston: Allyn & Bacon, 2003.

[51] Hair JF, Black WC, Babin BJ, et al. Multivariate Data Analysis [M]. 7th Ed. Upper Saddle River: Pearson Prentice Hall, 2009.

[52] Diamantopoulos A, Riefler P, Roth KP. Advancing formative measurement models [J]. Journal of Business Research, 2008, 61(12): 1203-1218.

[53] Rossiter JR. The C-OAR-SE procedure for scale development in marketing [J]. International Journal of Research in Marketing, 2002, 19(4): 305-335.

[54] Mackenzie SB, Podsakoff PM, Jarvis CB. The problem of measurement model misspecification in behavioral and organizational research and some recommended solutions [J]. Journal of Applied Psychology, 2005, 90(4): 710-730.

[55] Huang Yujing. Research on the neurophysiological process of fear emotion contagion during unconventional emergencies [D]. Hangzhou: Zhejiang University, 2014.

[56] Haldar S, Ray A, Chakraborty PK. Gender differences in information seeking behavior in three universities in West Bengal, India [J]. International Information & Library Review, 2010, 42(4): 242-251.

Author Contributions

Geng Ruili: Conceptualization, questionnaire design, results analysis, writing; Xu Jianguo: Literature review, questionnaire distribution, data analysis; Jin Yan: Research design, results analysis, paper revision; Wang Na: Research design, data collection; Fu Lihong: Questionnaire distribution, data collection.

Publication Ethics Statement

To strengthen and enhance academic norms, research integrity, and academic ethics in the processes of academic paper writing, review, and editing, establish good academic atmosphere, promote scientific spirit, resolutely resist academic misconduct, and establish and maintain a fair, just, and open academic exchange ecological environment, the *Library and Information Service* Magazine (including the editorial departments of *Library and Information Service* and *Knowledge Management Forum*) has formulated this publication ethics statement based on the actual conditions of the two journals and officially released it in February 2020.

This publication ethics statement commits that the two journals will strictly abide by and implement national policies and regulations related to academic ethics and editing and publishing, standardize the behaviors of authors, peer reviewers, and journal editors in the entire editing and publishing process, and accept supervision from the academic community and the whole society. The statement includes three main parts with a total of fifteen articles: (1) Author publication ethics (Academic papers are an important part of scientific research; academic misconduct is a tumor of academic papers; authors are the main contributors to academic papers; author signatures reflect intellectual property and academic contributions; academic papers must attach great importance to intellectual property and information security; standardized citation of references is an important manifestation of academic norms; great importance must be attached to the standardization of research data and management; establishment of error correction and academic self-purification mechanisms). (2) Peer reviewer publication ethics (Peer review is an important quality control mechanism for papers; reviewers should comply with relevant ethical guidelines and behavioral norms; reviewers must strictly follow relevant requirements for paper review). (3) Editor publication ethics (Editors should become guardians of academic paper quality; editors should play a monitoring role in academic ethics construction; editors should become the last barrier to curb academic misconduct; zero tolerance for academic misconduct).

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